

CLAIM SUMMARY

1 Canceled

2-9 Withdrawn

10-38 Canceled

39 Previously Presented

40 Withdrawn

41 Previously Presented

42 Withdrawn

43-55 Canceled

56 Previously Presented

57 Previously presented

58-63 New

1 (Canceled). An anchor for securing soft tissue to bone or to soft tissue comprising:

an attachment means having a long axis and a head at a first end of the long axis;

means to accommodate a securing or drive tool; and

an anchor hole through the head, the anchor hole having an upper aperture and a lower aperture, the anchor hole oriented to cause a line through the center of the anchor hole to intersect an extension of the long axis beyond the head.

2 (Withdrawn). The anchor or claim 1 further comprising:

a shoulder displaced about the attachment means near the head to provide a visual and tactile reference for maintaining proper head height above the bone.

3 (Withdrawn). The anchor or claim 1 wherein the upper aperture and lower aperture are chamfered.

4 (Withdrawn). The anchor or claim 3 wherein the chamfer extends from 5 to 50 percent of the total length of an anchor hole.

5 (Withdrawn). The anchor or claim 1 further comprising:

a plurality of anchor holes disposed about the circumference of the head.

6 (Withdrawn). The anchor or claim 1 wherein the anchor comprises an inert material.

7 (Withdrawn). The anchor or claim 1 wherein the anchor comprises plastic, stainless steel, titanium alloy or absorbable material or a combination thereof.

8 (Withdrawn). The anchor or claim 1 wherein the attachment means comprises a screw.

9 (Withdrawn). The anchor or claim 8 wherein the means to accommodate a securing or drive tool comprises a drive aperture on the head to accept a tool for imparting torque to the anchor.

10 (Canceled). The anchor or claim 1 wherein the head is generally conical having a vertex, an upper surface and a lower surface, the vertex of the cone attached to the attachment means with the primary axis of the cone collinear with the long axis of the attachment means.

11 (Canceled). The anchor or claim 10 wherein the angle between the lower surface and the long axis is between 90 and 150 degrees.

12 (Canceled). The anchor or claim 10 wherein the angle between the anchor holes and the long axis is between 0 and 75 degrees.

13 (Canceled). The anchor or claim 10 wherein the angle between the anchor holes and the long axis is between 35 and 50 degrees, and the chamfers are 45 degrees from a centerline through each anchor hole.

14(Canceled). A surgical anchor for reapproximating soft tissue to bone or to soft tissue comprising:

a screw having a head, a shank and a threaded end;

a shoulder between the body and the shank to provide a visual and tactile reference for proper head height above the bone;

means to accommodate a securing or drive tool; and

a plurality of generally radial anchor holes disposed about the circumference of the head and extending through the head, each anchor hole describing an angle between 0 and 75 degrees from the shank to the anchor hole.

15(Canceled). The anchor or claim 14 wherein the anchor comprises inert material.

16(Canceled). The anchor or claim 14 wherein the anchor comprises plastic, stainless steel, titanium alloy or absorbable material or a combination thereof.

17(Canceled). The anchor or claim 14 wherein the anchor holes are skewed about the long axis of the body.

18(Canceled). The anchor or claim 14 wherein the plurality of anchor holes further comprise apertures that are chamfered with a chamfer extending from 5 to 50 percent of the total length of an anchor hole.

19(Canceled). The anchor or claim 14 wherein the head is an inverted cone having a generally flat upper surface and a sloping lower surface describing an angle between 90 and 150 degrees from the surface of the shank.

20(Canceled). The anchor or claim 14 wherein the means to accommodate a securing or drive tool comprises a drive aperture on the head to accept a tool for imparting torque to the anchor.

21(Canceled). An anchor for securing soft tissue to bone or to soft tissue comprising:

an attachment means having a long axis and a head at a first end of the long axis;

means to accommodate a securing or drive tool; and

an anchor hole through the head, the anchor hole having an upper aperture and a lower aperture, the anchor hole oriented to cause a line through the center of the anchor hole to be skew to the long axis.

22(Canceled). The anchor of claim 21 further comprising:

a shoulder displaced about the attachment means near the head to provide a visual and tactile reference for maintaining proper head height above the bone.

23(Canceled). The anchor of claim 21 wherein the upper aperture and the lower aperture are chamfered.

24(Canceled). The anchor of claim 23 wherein the chamfer extends from 5 to 50 percent of the total length of an anchor hole.

25(Canceled). The anchor of claim 21 further comprising:

a plurality of anchor holes disposed about the circumference of the head.

26(Canceled). The anchor of claim 21 wherein the anchor holes are in a plane perpendicular to the long axis.

27(Canceled). The anchor of claim 21 wherein the attachment means comprises a screw.

28(Canceled). The anchor of claim 27 wherein the means to accommodate a securing or drive tool comprises a drive aperture on the head to accept a tool for imparting a torque to the anchor.

29(Canceled). The anchor of claim 21 wherein the anchor comprises an inert material.

30(Canceled). The anchor of claim 21 wherein the anchor comprises plastic, stainless steel, titanium alloy or absorbable material or a combination thereof.

31(Canceled). The anchor of claim 21 wherein the head is generally conical having a vertex, an upper surface and a lower surface, the vertex of the cone attached to the attachment means with the primary axis of the cone collinear with the long axis of the attachment means.

32(Canceled). The anchor of claim 31 wherein the angle between the lower surface and the long axis is between 90 and 150 degrees.

33(Canceled). The anchor of claim 31 wherein the angle between the anchor holes and the long axis is between 0 and 75 degrees.

34(Canceled). The anchor of claim 31 wherein the angle between the anchor holes and the long axis is between 35 and 50 degrees, and the chamfers are 45 degrees from a centerline through each anchor hole.

35 (Canceled). A surgical screw anchor comprising:

- threaded anchor body having a long axis and an outer dimension;

- a head at a first end of the anchor body adapted to accommodate a tool for securing or driving the anchor body into bone, the head having an outer dimension that is larger than the outer dimension of said anchor body; so said head is adapted to rest on the surface of a patient's bone when said anchor body is engaged in the bone and said head is adapted to be located above the surface of the patient's bone when said anchor body is engaged in the patient's bone; and

- a plurality of passages through the head, each passage having a longitudinal axis that is oriented at an angle with respect to the long axis of the anchor body, the longitudinal axis of each passage being oriented so that neither the longitudinal axis nor an extension of the longitudinal axis of each passage intersects the long axis of said anchor body, the passages being located above the surface of the patient's bone when said anchor body is engaged in the patient's bone, each passage having a first end and a second end and having the first end located adjacent to the patient's bone and the second end located spaced above the patient's bone with

the second end spaced farther from the patient's bone than the first end of each passage when said anchor body is engaged in the bone.

36 (Canceled). The surgical anchor defined in Claim 35, wherein the head has an upper surface, at least a portion of each passage extending to the upper surface of the head.

37 (Canceled). A surgical anchor having a long axis for securing soft tissue to bone or to soft tissue comprising:

a threaded screw having a head, a shank and a threaded end, the head having an arcuate outer dimension with a center, the shank having an outer dimension and a long axis which is located near the center of the outer dimension of the head, with the outer dimension of the head being greater than the outer dimension of the shank so said head rests on the surface of a patient's bone when the threaded end is engaged in the bone and -located above the surface of the patient's bone when the threaded end is engaged in the patient's bone;

the head including a driving element to accommodate a drive tool and a plurality of anchor holes each extending through the head at an oblique angle with respect to the long axis of the shank for receiving sutures, said anchor holes being located near the outer dimension of said head and radially spaced apart from the long axis of the shank and being located above the surface of the patient's bone when said threaded end is engaged in the patient's bone, each anchor hole being oriented so that neither the anchor hole nor an extension of the anchor hole intersects the long axis of said shank, each anchor hole having a first end and a second end, the

second end of each anchor hole being spaced farther from the patient's bone than the first end of the anchor hole when said anchor body is engaged in the patient's bone.

38 (Canceled). The surgical anchor defined in Claim 37, wherein the outer dimension of the head is circular.

39 (Previously Presented). A surgical anchor comprising:

- a threaded anchor body having a long axis and an outer dimension;

- a head at a first end of the anchor body adapted to accommodate a tool for securing or driving the anchor body into the bone of a patient, said head having an outer dimension that is greater than the outer dimension of said anchor body so said head is adapted to rest on the surface of the patient's bone when said anchor body is engaged in the bone and is located above the patient's bone when the anchor body is engaged in the bone, said head further including a first outer surface oriented to extend in the direction of the surface of the bone of the patient and a second outer surface that is oriented to extend in the direction of the surface of the bone of the patient, with the first outer surface abutting the surface of the patient's bone when the anchor body is in place and being located closer to the surface of the patient's bone than the second outer surface; and

- at least two suture passages extending through said head for receiving sutures, each passage having a longitudinal axis that is oriented at an oblique angle to the long axis of said anchor body and at an oblique angle to a plane containing the first outer surface of the head, the suture passages being oriented so that an extension of the longitudinal axis of each suture

passage will not intersect the long axis of said threaded body, each of said suture passages having a first portion and a second portion, the first portion of each suture passage being located near the surface of the patient's bone and the second portion of each suture passage being located spaced apart from and above the surface of the patient's bone and each suture passage being located above the surface of the patient's bone when said anchor body is engaged in the patient's bone.

40 (Withdrawn). The surgical anchor defined in Claim 39, wherein the head has an upper surface, at least a portion of each suture passage extending to the upper surface of the head.

41 (Previously Presented). A surgical anchor comprising:

- a threaded anchor body having a long axis, the anchor body having an outer dimension;
- a first end of said anchor body adapted to accommodate a tool for attaching said anchor body to bone of a patient, said first end having an outer surface which abuts the bone of a patient when the anchor body is attached to the bone of the patient, the first end further including an outer dimension, the outer dimension of said first end being greater than the outer dimension of said anchor body so said first end rests on the surface of a patient's bone when said anchor body is engaged in the bone; and

- at least one suture-accommodating passage defined in said first end to be located spaced from and above the surface of the bone and any tissue associated with the bone when said threaded anchor body is mounted in the bone to accept a suture thereinto and therethrough after said anchor body has been attached to the bone, said suture-accommodating passage being

radially spaced apart from the long axis of said threaded anchor body and having a portion thereof located near the outer dimension of said anchor body and having a first end located adjacent to the patient's bone and a second end spaced apart from the first end and above the patient's bone when said anchor body is engaged in the patient's bone said suture-accommodating passage being oriented to be at an oblique angle to a plane containing the outer surface of the first end and so that neither the suture-accommodating passage nor an extension of the suture-accommodating passage intersects the long axis of said threaded anchor body, the second end of said suture-accommodating passage being spaced farther from the patient's bone than the first end of said suture-accommodating passage when said anchor body is engaged in the patient's bone.

42 (Withdrawn). The surgical anchor defined in Claim 41 further including means on said anchor body for signaling when said anchor body is suitably fixed to the bone.

43 (Canceled). A method of securing soft tissue of a patient to bone of the patient comprising:

securing an anchor body to bone of a patient; and

after securing the anchor body to the bone of the patient, attaching a suture to the anchor body.

44 (Canceled). The method defined in Claim 43 wherein the anchor body includes a head and a suture-securing passage in the head, and the step of attaching a suture to the anchor body includes passing the suture through the suture-securing passage.

45 (Canceled). The method defined in Claim 43 wherein the anchor body includes a plurality of suture-securing passages and each suture-securing passage has a first end and a second end, and the step of attaching a suture to the body includes passing the suture through one suture-securing passage of the plurality of suture-securing passages from the first end of the one suture-securing passage toward the second end of the one suture-securing passage and passing another suture through a second suture-securing passage of the plurality of suture-securing passages from the second end of the second suture-securing passage toward the first end of the second suture-securing passage.

46 (Canceled). The method defined in Claim 44 further including passing a rethreading suture through the suture-securing passage after a suture initially placed in the suture-securing passage becomes inoperative.

47 (Canceled). A surgical screw anchor for anchoring a suture to a bone structure of a patient and adapted for placement therein with a placement tool, which anchor comprises:

- a threaded anchor body with a pointed first end, a second end and a body axis extending through said ends;

- a head located at the anchor body outer end, said head having an outer surface that extends in a direction of the surface of a patient's bone when said threaded anchor body is in place in the bone;

- said head being adapted to couple with the placement tool;

a suture passage extending through the head and having first and second apertures and a bore connecting the first and second apertures, the second aperture being located farther away from the surface of the patient's bone than the first aperture when said head is in place in the bone;

said suture passage being adapted to receive a suture;

said suture passage opening onto the outer surface of said head at said apertures; and

said suture passage being oriented with respect to the body axis to extend in a direction of the body axis with one of said apertures positioned closer to the bone structure of the patient than the other aperture when said threaded anchor body is in position in the bone structure, said suture passage being oriented so that neither the suture passage nor an extension of the suture passage intersects the body axis.

48 (Canceled). A surgical screw anchor for anchoring a suture to a bone structure of a patient and adapted for placement therein with a placement tool, which anchor comprises:

a threaded anchor body with a pointed first end, a second end and a body axis extending through said ends;

a head located at the anchor body outer end and having an outer surface that is oriented to extend in the direction of a surface of a patient's bone when said threaded anchor body is in place in the patient's bone;

said head being adapted to couple with the placement tool;

a suture passage extending through the head and having first and second apertures;

said suture passage being adapted to receive a suture;

said suture passage opening onto the outer surface of said head at said apertures; and
said suture passage being oriented at a non-right angle to the body axis of said threaded anchor body, the first aperture of said passage being located closer to the surface of the patient's bone than the second aperture when said threaded anchor body is in place in the patient's bone, said suture passage being oriented so that neither the suture passage nor an extension of the suture passage intersects the body axis.

49 (Canceled). The surgical screw anchor defined in Claim 35 wherein said head has an outer periphery which is arcuate in shape and has a center, the long axis of said threaded anchor body is located near the center of the arcuate shape and said passages are all spaced radially apart from the center of the arcuate shape.

50 (Canceled). The surgical screw anchor defined in Claim 35 wherein the longitudinal axis of each passage extends at an oblique angle to a plane containing the long axis of said anchor body and is spaced apart from the long axis of said anchor body.

51 (Canceled). The surgical screw anchor defined in Claim 35 wherein the longitudinal axis of each passage is oriented so that an extension of the longitudinal axis of each passage does not intersect the long axis of said anchor body.

52 (Canceled). The surgical screw anchor defined in Claim 51 wherein the longitudinal axis of each passage is oriented so that an extension of the longitudinal axis of each passage does not intersect an extension of the long axis of said anchor body.

53.(Canceled). The surgical screw anchor defined in Claim 37 wherein each anchor hole has a longitudinal axis and the longitudinal axis of each passage is oriented so that an extension of the long axis of each passage does not intersect the long axis of said anchor body.

54 (Canceled). The surgical screw anchor defined in Claim 41 wherein said suture-accommodating passage has a longitudinal axis and the longitudinal axis of said suture-accommodating passage is oriented so that an extension thereof does not intersect the long axis of said anchor body.

55 (Canceled). A surgical screw anchor comprising:

threaded anchor body having a long axis and an outer dimension;

a head at a first end of the anchor body adapted to accommodate a tool for securing or driving the anchor body into a patient's bone, the head having an outer dimension that is larger than the outer dimension of said anchor body; and

a plurality of passages through said head, each passage having a first end and a second end and longitudinal axis that extends between the first end of the passage and the second end of the passage and which is oriented at an angle with respect to the long axis of said anchor body, each passage being spaced apart from the long axis of the anchor body and oriented so that neither the passage nor an extension of the passage intersects the long axis of said anchor body, the second end of each passage being spaced farther from the patient's bone than the first end of the passage when said anchor body is engaged in the patient's bone.

56 (Previously Presented). The surgical screw anchor defined in Claim 39 wherein adjacent passages are parallel to each other.

57 (Previously Presented). The surgical screw anchor defined in Claim 56 wherein the passages are oriented in a circular pattern with respect to the long axis of said anchor body.

58 (New). A surgical screw anchor unit fixedly securing soft tissue of a patient to bone of the patient comprising:

- a needle;

- a suture fixedly secured to soft tissue of a patient and attached to the needle;

- a one-piece threaded anchor body having a long axis and an outer dimension, the anchor body being fixedly secured to bone of the patient;

- a head at a first end of the anchor body, the head being one piece with the anchor body and having an outer dimension that is larger than the outer dimension of the anchor body so the head rests on the surface of the bone of the patient, the head being located above the surface of the patient's bone; and

- a plurality of passages through the head, the suture passing through one suture passage and being fixedly secured to the head to fixedly secure the soft tissue to the anchor body and via the anchor body fixedly to the bone of the patient, each suture passage having a longitudinal axis that is oriented at an angle with respect to the long axis of the anchor body, the longitudinal axis of each passage being oriented so that neither the longitudinal axis nor an extension of the longitudinal axis of each suture passage intersects the long axis of the anchor body, the suture

passages being located above the surface of the patient's bone, each passage having a first end and a second end and having the first end located adjacent to the patient's bone and the second end located spaced above the patient's bone with the second end spaced farther from the patient's bone than the first end of each suture passage.

59 (New). A surgical anchor unit fixedly securing soft tissue of a patient to bone of the patient comprising:

- a needle;

- a suture attached to the needle and fixedly secured to soft tissue of a patient;

- a one-piece threaded screw having a head, a shank and a threaded end, the head and the shank and the threaded end all being one piece with each other, the head having an arcuate outer dimension with a center, the shank having an outer dimension and a long axis which is located near the center of the outer dimension of the head, with the outer dimension of the head being greater than the outer dimension of the shank so the head rests on the surface of a patient's bone and is located above the surface of the patient's bone;

- the head including a plurality of anchor holes each extending through the head at an oblique angle with respect to the long axis of the shank for receiving a suture, the anchor holes being located near the outer dimension of the head and radially spaced apart from the long axis of the shank and being located above the surface of the patient's bone, each anchor hole being oriented so that neither the anchor hole nor an extension of the anchor hole intersects the long axis of the shank, each anchor hole having a first end and a second end, the second end of each anchor hole being spaced farther from the patient's bone than the first end of the anchor hole,

the suture fixedly secured to soft tissue extending through an anchor hole and fixedly secured to the screw and fixedly securing the soft tissue fixedly secured thereto to the patient's bone via the one-piece screw.

60 (New). A surgical screw anchor unit comprising:

- a needle;

- a suture fixedly secured to soft tissue of a patient and attached to the needle;

- a threaded anchor body with a pointed first end, a second end and a body axis extending through the ends, the anchor body being fixedly secured to bone of the patient;

- a head located at the anchor body outer end, the head having an outer surface that extends in a direction of the surface of the patient's bone;

- a suture passage extending through the head and having first and second apertures and a bore connecting the first and second apertures, the second aperture being located farther away from the surface of the patient's bone than the first aperture;

- the suture extending through the suture passage and being fixedly secured to the anchor body, the soft tissue fixedly secured to the suture being fixedly secured to the patient's bone via the fixed securing of the suture to the anchor body which is fixedly secured to the patient's bone;

- the suture passage opening onto the outer surface of the head at the apertures; and

- the suture passage being oriented with respect to the body axis to extend in a direction of the body axis with one of the apertures positioned closer to the bone of the patient than the other

aperture, the suture passage being oriented so that neither the suture passage nor an extension of the suture passage intersects the body axis.

61 (New). A surgical screw anchor unit fixedly securing soft tissue of a patient to a bone of the patient comprising:

- a needle;

- a suture attached to the needle and fixedly attached to soft tissue of a patient;

- a threaded anchor body with a pointed first end, a second end and a body axis extending through the ends, the anchor body being fixedly secured to bone of the patient;

- a head located at the anchor body second end and having an outer surface that is oriented to extend in the direction of a surface of the patient's bone;

- a suture passage extending through the head and having first and second apertures;

- the suture passing through the suture passage and being fixedly attached to the anchor body, the soft tissue being fixedly secured to the patient's bone via the suture fixedly attached to the soft tissue and to the anchor body;

- the suture passage opening onto the outer surface of the head at the apertures; and

- the suture passage being oriented at a non-right angle to the body axis of the threaded anchor body, the first aperture of the passage being located closer to the surface of the patient's bone than the second aperture, the suture passage being oriented so that neither the suture passage nor an extension of the suture passage intersects the body axis.

62 (New). A surgical screw anchor unit comprising:

- a suture fixedly secured to soft tissue of a patient;

- a threaded anchor body having a long axis and an outer dimension, the anchor body being fixedly secured to bone of a patient;

- a head at a first end of the anchor body, the head having an outer dimension that is larger than the outer dimension of the anchor body; and

- a plurality of suture passages through the head, each suture passage having a first end and a second end and longitudinal axis that extends between the first end of the suture passage and the second end of the suture passage and which is oriented at an angle with respect to the long axis of the anchor body, each suture passage being spaced apart from the long axis of the anchor body and oriented so that neither the suture passage nor an extension of the suture passage intersects the long axis of the anchor body, the second end of each suture passage being spaced farther from the patient's bone than the first end of the suture passage, the suture extending through a suture passage and being fixedly attached to the anchor body, the soft tissue fixedly secured to the suture being fixedly secured to the bone of the patient via the suture fixedly secured to the soft tissue and to the anchor body which is fixedly secured to the bone of the patient.

63 (New). A surgical screw anchor unit comprising:

- a suture fixedly secured to soft tissue of a patient;

- a threaded anchor body having a long axis and an outer dimension, the anchor body being fixedly secured to bone of a patient;

a head at a first end of the anchor body; and

a suture passage through the head, the suture passage having a first end and a second end and longitudinal axis that extends between the first end of the suture passage and the second end of the suture passage and which is oriented at an angle with respect to the long axis of the anchor body, the suture passage being spaced apart from the long axis of the anchor body and oriented so that neither the suture passage nor an extension of the suture passage intersects the long axis of the anchor body, the second end of the suture passage being spaced farther from the patient's bone than the first end of the suture passage, the suture extending through the suture passage and being fixedly attached to the anchor body, the soft tissue fixedly secured to the suture being fixedly secured to the bone of the patient via the suture fixedly secured to the soft tissue and to the anchor body which is fixedly secured to the bone of the patient.